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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,547	03/11/2005	Hideaki Takase	266826US0PCT	7157
22850	7590	10/22/2007	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			BERMAN, SUSAN W	
			ART UNIT	PAPER NUMBER
			1796	
			NOTIFICATION DATE	DELIVERY MODE
			10/22/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/527,547	<b>Applicant(s)</b> TAKASE ET AL.	
	<b>Examiner</b> /Susan W. Berman/	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-12 and 14-19 is/are rejected.
- 7) ☒ Claim(s) 2,4 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Amendment***

The rejection of claims 1-8 under 35 U.S.C. 112, second paragraph, is withdrawn.

Applicant's argument that claim 4 is not taught by Watanabe et al is persuasive.

Applicant's argument with respect to showing unexpected results is persuasive with respect to claim 13.

***Response to Arguments***

Applicant's arguments dated 08-02-2007 have been fully considered but they are not persuasive.

Applicant argues that Watanabe et al do not distinguish among the components C and do not recognize an advantage to using aromatic di(meth)acrylate and an aromatic mono(meth)acrylate. Applicant's argument is persuasive with respect to instant claims 2 and 13 that recites a specific weight ratio of component (A) to component (B).

Applicant argues unexpected results are shown for Examples 1-4, 6 and 7 compared with Example 5 and comparative Examples 1-3 in the instant Specification. Example 5 and comparative Example 3 are not considered to be representative of the disclosure of Watanabe et al. Comparative Examples 1 and 2 are considered to be representative of the disclosure of Watanabe et al. These examples provide evidence that a composition comprising only A with the isocyanurate is deficient with respect to patterning ability and that a composition comprising only B with the isocyanurate has a significantly lower T<sub>g</sub> value. Watanabe et al teach obtaining a high refractive index and good chemical stability, impact resistance, heat resistance and a high transmission range. Takeyama et al teach that cured products obtained from tris(2-

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acryloxyethyl)isocyanurate in combination with a urethane acrylate have increased elastic modulus without changing elongation and lower water-absorption. Neither Watanabe et al nor Takeyama et al suggest a high Tg value or discuss patterning. However, the evidence for unexpected results provided by applicant is limited to compositions wherein (A) is a brominated bisphenol A epoxy (meth)acrylate, (B) comprises a brominated phenoxyethyl acrylate and (C) is tris(2-acryloyloxyethyl) isocyanurate with a photoinitiator. Instant claim 1 recites di(meth)acrylates (A) containing oxyalkylene linking groups ( $R^1$ ) and no bromine substitution and mono(meth)acrylates (B) containing alkyleneoxy linking groups ( $R^2$ ) and no bromine substitution for which there is no data showing unexpected results. Such compounds are taught by Watanabe et al as Component C of the disclosed compositions (column 8, lines 52-58). It is not clear whether the improvements in patterning ability and/or Tg would be obtained when these compounds having chemically different structures are employed.

Applicant argues that one skilled in the art would not have been motivated to combine the cited references. This argument is not persuasive because Takayama et al is relied upon for teaching that compositions comprising the same or analogous components as those taught by Watanabe et al are polymerizable in the presence of a photoinitiator. The combination is based upon the polymerizability of acrylate-functional substances by thermal initiation or by photoinitiation.

Applicant argues that neither Watanabe et al nor Takeyama et al disclose materials for use as or in optical waveguides. Applicant further argues that one skilled in the art would not have predicted the effect of including TAI, as suggested by the compositions taught by Watanabe et al, in the composition for a core and/or clad layer of an optical waveguide since neither JP

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'807 nor Nurse et al teach using TAI. This argument is not persuasive because Watanabe et al clearly teach compositions for optical materials for optical applications.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 6, 9-12 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al (4,959,431) in view of Takeyama et al (4,902,440). Watanabe et al disclose an optical material comprising a copolymer obtained from a trifunctional isocyanurate Component A, an aliphatic bifunctional monomer Component B, and an aromatic copolymerizable monomer Component C. See column 2, lines 50-60, column 5, lines 6-36, column 6, lines 23-58, column 7, line 66, to column 8, line 30, column 8, lines 40-58. Component C can be styrene, (meth) acryloxyethoxybenzene or 2,2-bis[4-(methacryloxyethoxy)phenyl]propane. Watanabe et al teach that the isocyanurate monomer and the Component C monomers provide a refractive index of at least 1.53. Examples 7-9 disclose compositions comprising, 2,2-bis[4-methacryloxyethoxy)phenyl] propane, a dimethacrylate monomer, a styrene monomer, tris(2-acryloxyethyl)isocyanurate and a thermal initiator. Examples 7-9 teach using mixtures of aromatic monomer component C.

It would have been obvious to one skilled in the art at the time of the invention to provide a composition comprising 30-65 wt. % tris(2-acryloxyethyl)isocyanurate as Component A, an

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aliphatic di(meth)acrylate Component B, an initiator and a mixture of Component C monomers, such as (meth) acryloxyethoxybenzene and 2,2-bis[4-(methacryloxyethoxy)phenyl]propane, selected from the specific monomers taught by Watanabe et al. The reason is that Watanabe et al provide Examples teaching such combinations including tris(2-acryloxyethyl)isocyanurate and mixtures of the specific monomers taught as examples of Component C. Watanabe et al further teach the properties each different kind of component confers to the resulting copolymer.

Takeyama et al disclose UV curable compositions for coating optical fibers comprising a urethane acrylate blended with tris(2-acryloxyethyl)isocyanurate, an optional diacrylate, a photoinitiator and reactive diluent. See column 3, lines 50-59, column 4, lines 13-16, column 6, lines 16-50. It would have been obvious to one skilled in the art at the time of the invention to employ a free radical photoinitiator, as taught by Takeyama et al in analogous compositions, instead of the free radical thermal initiator in the compositions disclosed by Watanabe et al. Takeyama et al provide motivation by teaching that analogous isocyanurate and (meth)acrylate materials are UV curable in the presence of a photoinitiator. One of ordinary skill at the time of the invention would have been motivated by a reasonable expectation of successfully employing UV radiation instead of thermal energy to polymerize the compositions disclosed by Watanabe et al in view of the teachings of Takeyama et al. With respect to claim 2, Watanabe et al do not suggest a weight ratio of aromatic difunctional (meth)acrylate to aromatic monofunctional (meth)acrylate. However, It would have been obvious to one skilled in the art at the time of the invention to determine the weight ratio of monomers required to obtain the desired properties in the optical article to be produced.

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Claims 1, 3, 5-7, 9-12 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 01-299807 in view of Watanabe et al (4,959,431) further in view of Takeyama et al (4,902,440), as applied to claims 1, 3, 5-6, 9-12 and 14-19 above. JP '807 disclose curable resin compositions for use as a core material in an optical waveguide. The compositions comprise components corresponding to applicant's components A through C, but do not include an isocyanurate monomer. Watanabe et al together with Takeyama et al disclose compositions for optical materials comprising the instantly claimed (meth)acrylate monomers.

It would have been obvious to one skilled in the art at the time of the invention to provide a waveguide, as taught by JP '807, from the analogous compositions comprising tris(2-acryloxyethyl)isocyanurate and a photoinitiator taught by Watanabe et al in combination with Takeyama et al. Watanabe et al provide motivation by teaching that the disclosed compositions comprising tris(2-acryloxyethyl)isocyanurate have excellent properties, such as highly crosslinked structure, good dyeability, high refractive index, great impact resistance and a small specific gravity. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of providing a useful waveguide with excellent optical properties.

Claims 1, 3, 5-12 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nurse et al (5,263,111) in view of JP 01-299807 further in view of Watanabe et al (4,959,431) and further in view of Takeyama et al (4,902,440), as applied to claims 1, 3, 5-7, 9-12 and 14-19 above. Nurse et al disclose a method for forming an optical waveguide using a photomask and radiation to apply a channel waveguide pattern. Watanabe et al together with

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Takeyama et al disclose radiation curable compositions for optical materials comprising the instantly claimed (meth)acrylate monomers.

It would have been obvious to one skilled in the art at the time of the invention to employ irradiation via a photomask of the compositions taught by Watanabe et al in view of Takeyama et al and being suitable for forming a waveguide, as taught by JP '807, in the method of patterning a channel waveguide pattern taught by Nurse et al. Nurse et al provide motivation by teaching patterning of a radiation curable composition. JP '807 provides motivation by teaching compositions comprising (meth)acrylate-functional materials corresponding to applicant's components A-C for forming a waveguide. Watanabe et al provide motivation to include tris(2-acryloxyethyl)isocyanurate in the compositions taught by JP '807, as discussed above. Takeyama et al provide motivation to include a photoinitiator in the compositions taught by Watanabe et al, as discussed above. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of successfully providing a channel waveguide pattern in an optical waveguide using radiation through a photomask, as taught by Nurse et al, and radiation curable compositions corresponding to the instant claim 1 composition, as taught by JP '807, Watanabe et al and Takeyama et al.

#### ***Allowable Subject Matter***

Claims 2, 4 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. With respect to claims 2 and 13, Watanabe et al do not teach or suggest the weight ratios of aromatic difunctional (meth)acrylate to aromatic monofunctional



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(meth)acrylate set forth. Additionally, Applicant has provided comparative examples in Table 1 evidencing the criticality of the weight ratio of component (A) to component (B) as set forth in claim 13. With respect to claim 4, Watanabe et al teach a significantly higher weight percent of Component A (tris(2-acryloxyethyl)isocyanurate) then set forth in the instant claim. There is no motivation provided to reduce the weight percent of Component A in the disclosed compositions.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Susan W. Berman/ whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SB  
10/14/2007

/Susan W Berman/  
Primary Examiner  
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